

TAMIL NADU PUBLIC SERVICE COMMISSION
SYLLABUS
HORTICULTURE (UG Degree Standard)

Code: 493

Unit I: Fundamentals of Horticulture (15 questions)

Scope and importance – State, National and Global scenario of horticultural crops – Area and production – Import and export – Nutritive value and Medicinal value of horticultural crops – Horticultural zones of Tamil Nadu and India – National and regional agencies involved in promotion of horticultural industry in India (NHB, APEDA, Commodity Boards and Government schemes) – Classification of horticultural crops – Factors limiting horticultural crop production – Role of season – Soil and climate requirements - Physical and chemical properties of soil - Climatic factors – Light, temperature, photoperiod, relative humidity, rainfall, altitude, microclimate - Kitchen gardening - Nutrition gardening – Truck gardening – Market gardening - Vegetable forcing - Protected and precision horticulture – Hydroponics, Aeroponics – Nutrient Film Technique – Vertical farming - Horticulture therapy.

Unit II: Growth and Development of Horticultural Crops (15 questions)

Important phases of growth and development - Bearing habits – Classification of horticultural crops based on life cycle – Annual, biennial, perennial (woody and herbaceous perennials) – Fruitfulness and unfruitfulness - External and internal factors associated with unfruitfulness – Physiology of flowering, fruit set, ripening and senescence – Fruit drop - Causes and control measures - Plant growth regulators – Functions and role in horticultural crops - Bud dormancy – Dormancy breaking – Parthenocarpy – Parthenogenesis – Polyembryony – Stenospermocarpy – Vivipary - Apomixis.

Unit III: Propagation of Horticultural Crops (15 questions)

Propagation – Definition – Establishment of nursery – Site selection - Tools and implements propagation structures - Mist chamber, phytotron - Humidifiers – Greenhouse – Glasshouse – Polyhouse - Shade net, glass house, poly tunnels, cold frames and hotbeds, pit nursery - Media and containers – Soil sterilization - Sexual propagation – Merits and demerits – Crops propagated through seeds - Seed viability, longevity, dormancy, germination – Pre-sowing treatment – stratification, scarification, seed priming, seed pelleting, seed invigoration, seedling vigour – Raised seed bed and pro-tray nursery – Asexual propagation – Merits and demerits – Methods of vegetative propagation – Identification of plus trees – Mother block, scion bank – Clonal nursery – Chimeras - Cutting – Layering – Grafting, budding types – Anatomical and physiological basis of grafting – Stock scion relationship, graft compatibility – Budwood selection and certification – Top working and after care - Propagation through specialized plant parts (bulbs, tubers, offsets, runners, suckers, slip, crown, rhizomes, corms) – Quality management and nursery certification – Micro propagation – Application – infrastructure requirements – Types of media – Stages of micro propagation – Micro grafting – *in vitro* propagation of important horticultural crops.

Unit IV: Management Techniques for Horticultural Crops (15 questions)

Planning – Layout and management of orchards – Fencing – Wind breaks and shelter beds – Spacing – Planting system – Physical and chemical properties – Soil reaction – acid, saline and alkaline soils – Soil fertility - Essential elements – Functions - Organic manures and inorganic fertilizers, Water soluble fertilizers - Bio-fertilizers, vermicomposting - Applications and management – Nutrient deficiencies and corrective measures - Physiological disorders and remedies – Irrigation, micro irrigation and maintenance – Critical stages of water requirement – Effect of water stress on crop yield – Anti-transpirants – management of irrigation water quality - Conventional and micro irrigation – Fertigation - Mulching – Sod culture – Weed management – Application growth regulators – Training and pruning principles and methods - Rejuvenation of senile and old orchards – Cropping systems - Cover cropping - Multitier cropping – Intercropping – Special horticultural techniques (pinching, thinning, disbudding, blanching, smudging, notching, ringing) - Principles of organic horticulture – GAP and GMP.

Unit V: Production Technology of Fruit Crops (30 questions)

Scope and importance of fruit crops - Composition and uses - Origin and distribution – Species – Season - Climate and soil requirement – Varieties and hybrids – Propagation techniques - Planting systems and planting density including High density planting (HDP) and ultra high-density planting (UHDP) – spacing – Water and nutrient management – Fertigation - Weed management - Canopy management - Training and pruning – Intercultural practices - Off season production - Special horticultural techniques – Use of plant growth regulators – Maturity indices - Harvest and yield – Nutrient deficiencies and physiological disorders and its corrective measures and management of important pest and diseases of important fruit crops :- Mango, Banana, Acidlime, Sweet orange, Mandarin, Grapes, Papaya, Guava, Sapota, Pineapple, Jackfruit, Pomegranate, Aonla, Annona, Ber, Sweet tamarind, Jamun, Fig, Apple, Pear, Plum, Peach, Strawberry, Litchi, Avocado, Carrisa, West Indian Cherry, Date Palm, Phalsa, Bael, Wood apple, Rose apple, Bread fruit, Bilimbi, Durian, Carambola, Mangosteen, Loquat, Passion fruit, Rambutan, Pumelo, Grape fruit, Cherries,

Currants, Apricot, Persimmon, Olive, Pecanut, Chestnut, Hazelnut, Kiwi, Pistachionut, macadamianut, Walnut and Almond and minor tropical, arid and temperate fruit crops.

Unit VI: Production Technology of Vegetable Crops (30 questions)

Scope and importance of vegetable crops - Composition and uses - Origin and distribution – Area and production - Soil and climatic requirements - Varieties and hybrids – Propagation methods - Seed rate – Sowing and nursery practises – Containerized seedling production - Season – Planting methods – Water, nutrient and weed management – Fertigation – Training for vegetables – Intercultural practices - Maturity indices – Harvest and yield – Nutrient deficiencies and physiological disorder and its corrective measures of important vegetable crops: Tomato, Brinjal, Chilli and Capsicum (Sweet Pepper), Bhendi, Leguminous vegetables (Beans, Peas, Cluster beans, Cowpea, Dolichos bean); Bulbous vegetables (Onion, Garlic); Tuber crops - (Potato, Tapioca, Sweet potato, Elephant foot yam, Dioscorea, Chinese potato, Colacassia); Cucurbitaceous vegetables (Cucumber, Bitter gourd, Snake gourd, Ridge gourd, Ash gourd, Musk melon, Water melon, Pumpkin) - Cruciferous vegetables (Cabbage, Cauliflower, Knol khol, Brussels sprout, Sprouting broccoli and Chinese Cabbage); Root vegetables (Carrot, Radish, Beetroot, Turnip) - Leafy vegetables (Spinach, Lettuce, Palak, Amaranthus, Agathi and Asparagus) – Perennial vegetables (Drumstick, Coccinea) – Protected cultivation of vegetable crops - Precision farming of important vegetable crops and seed production.

Unit VII: Floriculture & Landscape Gardening (30 questions)

Scope and importance of flower crops production - Uses - Origin and distribution – Area and production - Climate and soil requirement - Species and varieties - Propagation, season - Spacing and planting methods - Irrigation, nutrient management – Fertigation – Weed management - Training and pruning – Intercultural operations – Special horticultural techniques – Growth regulators – Off season production - Maturity indices – Harvest and yield and management of important pest and diseases for important loose flower crops: Jasmine, Rose, Tuberose, Chrysanthemum, Marigold, Nerium, Ixora and Crossandra - Cut flowers - Rose, Carnation, Anthurium, Orchid, Liliun and Gerbera – Cutfoliage and fillers. Principles of Landscape designing – Styles of gardening - Types of gardening viz., Hindu, English, Mughal, Japanese, Persian, Italian, French gardening Garden components – Trees foliage flowering and avenue trees – Burlapping – Shrubs -Hedge and edge plants – Flowering annuals creepers and Climbers - Cacti and succulents Lawn – Types of grasses – Layout, planting and maintenance of lawn –Indoor plants and interior scaping – Garden adornments - Principles and styles of flower arrangements – Bonsai styles and culture – Industrial, Institutional, Public and Private landscaping - Special types of gardening –Kokedama, tray, terrarium, roof and vertical gardening – Computer Aided Designs for Landscaping – AUTOCAD garden design.

Unit VIII: Production Technology of Spices and Plantation Crops (20 questions)

Scope and Importance of spices and plantation crops - Composition and uses - Origin and distribution – Area and production – Climate and soil requirements - Species and varieties - Season, seed rate / Vegetative propagation methods – Spacing - Planting systems – High density planting (HDP) – Ultra High Density Planting (UHDP) - Irrigation and nutrient management – Fertigation - Weed management – Training and pruning – Cropping systems – Multitier cropping – Cover cropping – Inter cropping - Growth regulators – Mulching - Shade trees and canopy regulation – Maturity indices, harvest, yield and management of important pests and diseases - Processing methods of important plantation and spice crops: Major spices, seed spices, tree spices, herbal spices and minor spices - Black Pepper, Cardamom, Turmeric, Ginger, Curry leaf, Clove, Nutmeg, Cinnamon, Coriander, Fenugreek, Cumin, Tamarind, Allspice and Vanilla – Plantation crops - Tea, Coffee, Rubber, Cocoa, Coconut, Oil palm, Cashew, Palmyrah and Arecanut.

Unit IX: Production Technology of Medicinal and Aromatic Crops (10 questions)

Scope and importance of medicinal and aromatic crops - Composition and uses - Origin and distribution – Area and Production - *Ex situ* and *in situ* conservation – Classification of medicinal and aromatic crops – Constraints in medicinal plants cultivation - Climate and soil – Varieties – Propagation - Nursery practices - Planting methods - Cropping systems – Manures and Fertilizers – Irrigation – Intercultural operations – Harvest indices – Harvest and yield - Management of important pests and diseases - Production systems - Contract farming – Good Agricultural Practices (GAP) – Good Cultivation Practices (GCP) – Good Manufacturing Practices (GMP) - Organic production and certification – Classification and distillation methods of essential oils – Secondary metabolite production - Value addition - Organisational support for promotion of medicinal and aromatic crops - Medicinal crops: Senna, Periwinkle, Glory lily, Ashwagandha, Medicinal coleus and Solanum, Sweet flag, Aloe, Isabgol, *Phyllanthus*, *Stevia*, Opium poppy. Aromatic crops: Lemon grass, Citronella, Vetiver, Ocimum, Davana, Mint, Geranium, Patchouli and Eucalyptus.

Unit X: Post-Harvest Technology of Horticultural Crops (20 questions)

Importance of Post-harvest handling in horticultural crops – Maturity indices – Post-harvest handling methods – Ripening chambers – Washing – Grading - Waxing – Grades and standards – Methods of packing - Types

of containers and their advantages and disadvantages – Storage - Principles and methods of refrigerated storage - Storage methods - Pre-cooling - Controlled Atmospheric Storage (CAS), Modified Atmospheric Storage (MAS) – Low pressure storage and cold chain concept - Importance and scope of processing industries in India - General principles of fruit and vegetable preservation like canning, dehydration, freezing, fermentation - Use of chemicals (preservatives) and irradiation – Good Manufacturing Practices (GMP) – Food safety and quality control.

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